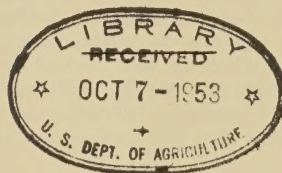


NEVADA 12 ESMERALDA

FIELD APPRAISAL ANALYSIS

Prepared by
Field Appraisal Section
Program Analysis Division
RURAL ELECTRIFICATION ADMINISTRATION



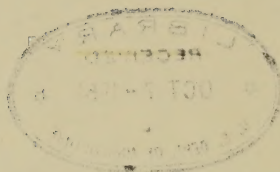
Field Appraisal
Completed in
April 1953

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RESEARCH REPORT

RESEARCH REPORT

Prepared by
Field Research Section
Program Analysis Division
RURAL RESEARCH ADMINISTRATION



Field Research
Completed in
April 1951

RESEARCH REPORT

1951

844447

2-Summary - Nevada 12 Esmeralda - June 12, 1953

ULTIMATE NUMBER OF CONSUMERS

The cooperative estimates a total of 225 consumer services, of which 155 are signed and 70 are potential. Except for numbers of large commercial and irrigation consumers, the cooperative's estimates of ultimate numbers appear reasonable. The numbers indicated by this analysis are as follows:

<u>Consumer Class</u>	<u>Estimated Number</u>
Farm	62
Nonfarm Residential	17
Small Commercial	6
Public Buildings	2
Irrigation	110
Large Commercial	3
Total	200

The appraiser's classification of these same consumers would indicate 70 instead of 62 meters for farm consumers.

ESTIMATES OF FUTURE KWH CONSUMPTION AVERAGES

Farm and nonfarm residential consumers indicated an average monthly usage of 379 kwh to be attained within 3 years following energization. This indication has been adjusted on the basis of: (1) the usage trends of a comparable neighboring system, (2) the period of time required by other systems in the general area to achieve unadjusted field appraisal indications, (3) the presence of home electric plants, (4) willingness of members to pay high minimums, (5) multiple dwelling units per meter, (6) expected delay in conversion from other fuels, and (7) the seasonal character of some consumers. The estimated monthly averages for farm and nonfarm residential consumers are 190 kwh upon energization, 295 kwh after 3 years, and the indicated 379 kwh after about $5\frac{1}{2}$ years.

In some respects present development plans for Fish Lake Valley appear to be on the margin of feasibility, and should they prove unsuccessful, the number of consumers and average power use would be much lower than the estimates indicated by this analysis.

Based on factors believed to be significant, the following estimates are certified to be consistent with development plans for Fish Lake Valley and likely to be attained at periods following energization as specified:

June 12, 1953

Field Appraisal Section
Program Analysis Division

SUMMARY AND CONCLUSION
NEVADA 12 ESMERALDA

AREA CHARACTERISTICS

The proposed system area lies primarily in Esmeralda County, Nevada, in an area known as Fish Lake Valley. This valley was first settled some 75 years ago by miners and ranchers, but very few of the ranchers were successful. Attempts were made to resettle in 1906 and 1923, but they were of little success, partially because of the isolation and transportation difficulties. In 1949, another attempt began with more than 100 agricultural applications filed under the Desert Homestead Act. The 1950 population of the Fishlake District was 106, a decline of 9 percent from the population in 1940.

There were 19 farms and 60 farm dwelling units in Esmeralda County in 1950, according to census reports. The cooperative classifies 62 signed and potential consumers as farms. Farms now average a little less than 1,000 acres. While farm size in the county increased 44 percent over the period 1940-1950, value of agricultural land and buildings per farm increased almost nine times, a rate greater than for the State of Nevada as a whole and to a level higher than for any other county in the State. Gross income per farm from sale of farm products averaged \$8,976 in 1949 in the county compared to a State average of \$10,784. Livestock other than dairy and poultry accounts for 90 percent of the value of farm products sold. Most stock are sold as feeders. Respondents in the survey reported 20 existing irrigation wells; and census data for the county indicates about one-third of the land in farms is irrigated, being mainly irrigated pasture.

About 80 percent of the farmers interviewed reported part or full ownership of the farms they operated. Many of the valley farmers come from towns in California and Nevada and do not remain in the valley throughout the year. Approximately three-fifths of the valley residents have electricity, but none receive it from a power line.

There was one large industrial establishment operating in the area when the appraisal was made. Deposits of gold, silver, copper and lead are reported in the county. However, the two mines listed by the cooperative as signed members were not operating at the time of the appraisal. There are about six establishments in the area which could be termed prospective small commercial consumers of the proposed system.

The valley floor extends about 45 miles north and south. Altitude ranges from around 5,000 feet in the valley to 7,000 and 12,000 feet on the crests of surrounding mountain ranges. Soils are typical of the arid regions. Ground water appears to be adequate for planned irrigation.

3-Summary - Nevada 12 Esmeralda - June 12, 1953

<u>Class of Consumer</u>	<u>Average Monthly Kwh to be Attained Following Energization</u>		
	<u>In 2 Yrs.</u>	<u>In 5 Yrs.</u>	<u>In 10 Yrs.</u>
Farm ^{a/}	325	435	580
Nonfarm Residential	100	130	200
Small Commercial	300	340	400
Public Buildings	65	80	100
Irrigation (26 HP) (annual)	20,000	20,000	20,000
Large Commercial (annual)			
Sierra Talc & Clay Co. (50 kw)	60,000	60,000	60,000

^{a/} These estimates are for the number of farm consumers as classified by the cooperative. Based on the appraiser's classification, there would be 70 farm consumers for which equivalent averages would be 290,385 and 515 kwh in 2, 5 and 10 years.

Robert D. Partridge, Assistant Chief
Program Analysis Division

June 12, 1953

Field Appraisal Section
Program Analysis Division

ANALYSIS OF BASIC FACTORS RELATED TO
THE RURAL ELECTRIFICATION LOAN FOR
NEVADA 12 ESMERALDA

This analysis of factors related to the future consumption by consumers of the Fish Lake Valley Improvement Association, which proposes to serve the area of Fish Lake Valley on the California-Nevada border, is based on a field study conducted by Vergil Bufford, Agricultural Economist, and completed in April 1953. This analysis was prepared by Robert B. Williamson, Business Economist. The field work consisted primarily of visits to signed and potential members representing an estimated 101 consumer units. These consumer units include 37 farms, 8 nonfarm residences, 4 small commercials, 1 large commercial, and 51 existing and planned irrigation wells.^{1/} Supporting economic data were obtained from the U. S. Census for Esmeralda County, Nevada, and from other secondary sources.

NATURE OF INDICATED AVERAGE CONSUMPTION
AS REVEALED BY THE SURVEY

Farm and Nonfarm Residential Consumers

The following consumption averages are exclusive of irrigation usage and are for consumer units as classified by the appraiser.

A tabulation of raw data secured from respondents revealed the average monthly consumption presented in Table I.

^{1/} Respondents in the survey were all the signed and prospective consumers the appraiser was able to find in the area and comprise a 40 percent sample of the 225 signed and potential services reported in the loan application. Farm and nonfarm residential respondents accounted for 47 percent of the 79 services for these classes reported in the application. The appraiser's and respondents' opinions of the number of separate services required resulted in some differences in the appraisal and application classifications of consumer units. The 101 total of consumer units in the survey represent an estimated 91 services provided by the cooperative's application. The 45 farm and residential units in the survey represent 37 units in the application.

TABLE I
INDICATED MONTHLY KWH CONSUMPTION^{a/}

<u>Consumer Class</u>	<u>Indicated Future Consumption</u>
Farm and Nonfarm Residential	379

^{a/} Based on electrical equipment respondents expect to have within 3 years after they receive central station electric service.

A frequency distribution of farm and nonfarm residential consumers according to the amount of electricity they indicated using within 3 years is shown in Table II.

TABLE II
FREQUENCY DISTRIBUTION OF MONTHLY FARM AND NONFARM RESIDENTIAL KWH CONSUMPTION

<u>Average Monthly Consumption</u>	<u>Percent</u>
Under 50	2
50 - 99	18
100 - 299	27
300 - 499	15
500 - 699	31
700 and over	7
	<u>100</u>

Indicated average monthly usage ranged from 48 kwh to 1,655 kwh with approximately one-half the consumers indicating average monthly use in excess of 300 kwh.

Table III presents in detail the expected future saturation of appliances for all farm and nonfarm residential respondents in the survey as indicated by them at the time of the appraisal.

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TABLE III

INDICATED FUTURE SATURATION OF ELECTRICAL
APPLIANCES AND EQUIPMENT, FARM AND
NONFARM RESIDENTIAL CONSUMERS^a

Appliance or Equipment	Percent of Consumers Indicating Future Use	Number of Appliances Per 100 Consumers	Total Kwh Requirements Per 100 Consumers ^b
Air Compressor	20	20	700
Battery Charger	16	16	187
Blanket	22	40	6,000
Brooder, Hover	11	11	4,074
Clock	44	53	959
Drill Press	44	44	533
Evaporative Cooler	31	36	2,563
Fan, Household	7	9	134
Food Mixer	49	53	1,333
Forge	11	11	133
Freezer, Cabinet	69	76	68,040
Garden Watering	4	4	330
Heating Pad	4	4	13
Iron	91	104	10,440
Ironer	18	18	2,136
Lathe	16	16	187
Lighting			
Beef Cattle Barn	2	2	26
Bunk House	9	20	300
Garage	27	27	214
General Barn	27	29	694
Grain and Feed Storage Building	4	4	9
Hog Barn	2	2	7
House	100	118	35,340
Other Buildings	16	40	480
Poultry Laying House	27	29	1,012
Shop	38	38	454
Yard	91	153	2,759
Milk Pasteurizer	2	2	264
Pig Brooder	2	2	440
Percolator	53	62	3,732
Power Saw	22	22	266
Pressure System, 22' or less	27	29	5,202
Pressure System, over 22'	42	42	10,128
Radio ^c	100	129	13,000
Range	53	58	69,360

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Appliance or Equipment	Percent of Consumers Indicating Future Use	Number of Appliances Per 100 Consumers	Total Kwh Requirements Per 100 Consumers ^{d/}
Refrigerator ^{d/}	91	102	41,808
Sewing Machine	18	18	178
Soldering Iron	11	11	167
Space Heater, Supplementary	2	2	154
Toaster	71	80	2,800
Tool Grinder	47	47	1,168
Vacuum Cleaner	58	60	1,200
Waffle Iron	73	78	1,945
Washing Machine	71	78	2,723
Water Heater	47	53	159,900
Welder	11	11	833
Kwh per 100 consumers per year			454,325
Kwh per consumer per year			4,543
Kwh per consumer per month			379

- a/ Based on electrical equipment respondents expect to have within 3 years after they receive central station electric service.
- b/ Average annual requirements determined by REA times the number of appliances per 100 consumers.
- c/ Includes one respondent with a radio transmitter.
- d/ Includes one respondent with two "walk-in" refrigerators.

Other Classes

For other classes, replies of respondents indicate the following consumption averages to be attained in the next few years.

<u>Class</u>	<u>Average Kwh Consumption</u>
Small Commercial (monthly)	317
Public Buildings	---
Irrigation (26 HP) (annual)	20,000
Large Commercial (annual)	
Sierra Talc and Clay Co. (50 kw)	60,000

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ECONOMIC CHARACTERISTICS

The proposed service area is confined to Fish Lake Valley and includes a portion of Esmeralda County, Nevada, and small portions of the counties of Mono and Inyo in California (Figure 1). This area on the southwest boundary of Nevada lies about halfway between Reno and Las Vegas, Nevada, about 30 air miles north of Death Valley National Park and approximately 250 miles by road northeast of Bakersfield, California.

U. S. Census data for Esmeralda County, Nevada, are used where information is not available for the specific area to be served. Most of the proposed service area and approximately three-fourths of the signed and potential members are located in Esmeralda County. With less than 1 percent of the total land area in Esmeralda County in farms in 1950, it can be assumed that a large share of this farm land was in Fish Lake Valley. Comparison of characteristics of farms in the survey with census data for the county indicates the county data to be fairly representative of the service area.

Fish Lake Valley was first settled some 75 years ago by miners and ranchers, very few of whom were able to make a success of farming and stock raising. Since that time three attempts have been made to resettle this valley, but due to its isolation and transportation of produce very few were able to remain. These attempts to resettle were made in 1906, 1923, and 1949...In 1949 more than 100 agricultural applications were filed on land in Fish Lake Valley under the Desert Homestead Act.^{1/}

The population of Esmeralda County was completely rural in 1950 and, of the 614 total, 80 were classified as farm and the remaining 534 as rural-nonfarm. In the same year, 18 percent of the labor force was in agriculture, 46 percent in mining, and the other 36 percent in miscellaneous businesses.

Whereas only 19 farms were reported for the county in the 1950 Census, 60 farm dwelling units were reported. There are several large ranches in the county occupied by more than one family unit. Of the farms in the survey, 30 percent were 1,000 acres or more in size. The average size was 983 acres and the median size about 340 acres.

Farm property values in Esmeralda County were \$111.37 per acre and \$156,389 per farm in 1950 according to the census. Of the items shown in Table IV, this was the only one to increase at a greater rate for the county than for the State of Nevada. The value per farm is the highest of any county in the State and is much higher than the value of farm sales would seem to justify. These valuation figures may be overstated because, while census data, they are based on a 20 percent sample.

^{1/} The letter of transmittal, July 21, 1952, accompanying the cooperative's application. This letter presents what appears to be a fair statement of facts regarding farming and irrigation in the valley.

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Data reflecting population and economic conditions and trends for the decade preceding the latest attempt at resettlement are shown in Table IV.

TABLE IV
TRENDS RELATED TO ELECTRIC
POWER CONSUMPTION

Item and Relationship	Trend Data			Percent Change ^{a/}
<u>Population</u>	<u>1940</u>		<u>1950</u>	
Fishlake District	116		106	- 9
Esmeralda County	1,554		614	- 61
State of Nevada	110,247		160,083	+ 45
Ratio County to State	.0141		.0038	--
<u>Number of Farms</u>	<u>1940</u>	<u>1945</u>	<u>1950</u>	
Esmeralda County	25	19	19	- 24
State of Nevada	3,573	3,429	3,110	- 13
Ratio County to State	.0070	.0055	.0061	--
<u>Acres Per Farm</u>	<u>1940</u>	<u>1945</u>	<u>1950</u>	
Esmeralda County	652	737	936	+ 44
State of Nevada	1,059	1,802	2,271	+114
Ratio County to State	.62	.68	.41	--
<u>Value of Farm Land and</u>				
<u>Buildings Per Acre</u>	<u>1940</u>	<u>1945</u>	<u>1950</u>	
Esmeralda County	\$19.04	\$24.44	\$111.37	+485
State of Nevada	\$12.57	\$11.65	\$ 22.70	+ 81
Ratio County to State	1.52	2.10	4.91	--
<u>Average Gross Income From</u>				
<u>Farm Products Sold</u>	<u>1939</u>	<u>1944</u>	<u>1949</u>	
Esmeralda County	\$2,797	\$4,901	\$ 8,976	+221
State of Nevada	\$3,149	\$6,801	\$10,784	+242
Ratio County to State	.89	.72	.83	--

^{a/} Over 10-year period.

Livestock other than dairy and poultry accounted for 90 percent of the value of farm products sold in 1949. Cattle and calves were reported by 80 percent of the farms in the county in 1950 with an average of 190 head per farm reporting. This represents no important change since 1945. Crops grown in the area include alfalfa cut for hay, grain, potatoes, and beans. The county agent in the area in his 1951 and 1952 Annual Narrative Reports observes that there is increasing acreage in

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alfalfa hay, most of which is used in connection with range livestock operations. Most of the farms have some irrigated land which is the nucleus of their ranching. A large percent of the land grazed in Esmeralda County is public land. Animals for sale are usually moved on to the market as feeders.

Approximately 80 percent of the farm respondents in the appraisal indicated part or full ownership of the farms they operated. Except for the operators of the few very large ranches, the farm population of Fish Lake Valley is presently composed of people who have recently come from various parts of Nevada and California. Some have had agricultural experience, others are people from cities with a desire to become ranchers. Many of those who have moved in recently have built a house, drilled a well, and done some farming, while others have the land and the well but have not moved to the valley. Many of those from cities leave the valley in the fall and do not return until late spring.

A few of the new settlers have had a crop failure and have left the valley to return to town in order to make more money before making another attempt at ranching. Many of the newly arrived persons have worked at the large ranches or mines while getting themselves established. Twenty-two percent of the farm operators in the survey reported off-farm employment. The average number of days employed during the last year was over 200.

The 1947 Census of Manufactures reported 2 establishments in Esmeralda County, each employing less than 20 employees. One of these was classified as a printing and publishing establishment, the other apparently was the Sierra Talc and Clay Company. In addition, various mines have been in operation in the general area. Listed in the application are the Garnet-King Mine and the Sylvania Mine. A little to the east of these is the Palmetto Mine. According to the 1949 Minerals Yearbook, Sylvania Mine produced small amounts of gold and silver and the Palmetto Mine produced silver, copper, and lead. No data for Garnet-King Mine was given. The 1948 Census reported no wholesale establishments and only 20 retail establishments in Esmeralda County.

None of the farms receive central station electric service, but 58 percent of the farm and nonfarm respondents reported home electric plants. Only one farm in the valley is reported to have a telephone.

Ranchers in the valley trade in towns 60 to 80 miles away, as there is only a small country store in the community. According to the census, county farmers travel an average distance of 3 miles over dirt or unimproved roads to trade centers. The most frequented trade centers are Bishop and Lone Pine in Inyo County, California, and Tonopah in Nye County, Nevada. These towns are between 1,000 and 3,000 population, and each has a bank and airport. Lone Pine is served by the Southern Pacific Railroad. The Agricultural Extension Service County Agent Office for the area is at Tonopah. Goldfield, with a population of about 600, is the county seat of Esmeralda County.

PHYSICAL CHARACTERISTICS

The valley floor of Fish Lake Valley extends approximately 45 miles north and south and ranges in width from 1 to 5 miles. The altitude of the valley floor is approximately 5,000 feet with a gentle downward slope to the north. The valley is enclosed by mountains except for the outlet at the north known as the Gap. The ranges surrounding the valley are the White Mountains on the west with an average altitude of about 12,000 feet, the Silver Peak Range on the east with a crest altitude averaging about 7,500 feet, and the Palmetto and Sylvania Mountain Ranges on the south.

Soils are typical of the arid regions, ranging from sandy and sandy loam to gravel. Generalized soil and land use maps indicate a nucleus of stony land with little timber or vegetation. What value this land has is principally for range with some farming. Surrounding this nucleus are desert soils. Most of this land is useful only as livestock range with low carrying capacity. Under irrigation, similar areas have proven highly productive of a number of crops.

A reconnaissance land survey of the valley classified approximately 8,500 acres, 3,500 acres or more of which was presently owned by established ranches, as Class I, suitable for immediate development, and classified 14,500 acres, a considerable part of which was presently in private ownership, as Class II, of doubtful present value for crops. All remaining land in the valley was considered definitely unsuitable for development for crops. Class III includes sand dunes, alkaline-bottom soils, and the rough upper slopes. This land survey also refers to excessive wind erosion of the light-textured soils and the presence of soil characteristics which make irrigation expensive. These and other factors tend to limit field crop adaptation to alfalfa, potatoes, and irrigated pasture.^{1/}

Actual crop yields reported in the 1950 Census were slightly higher for the county than for the State as a whole. Annual yields per acre in the county for alfalfa hay, grains, and potatoes were 3.1 tons, 37 bushels, and 14,000 pounds, respectively. Yields in the valley for alfalfa and potatoes as reported by the cooperative were about twice as high as the county averages. Commercial fertilizer is used in the production of potatoes.

Weather records at Oasis Ranch on the floor of the valley show a growing season of 111 days with average January temperatures of 29° and average July temperatures of 70°. Average annual precipitation of less than 5 inches is indicated for the valley floor with heaviest precipitation in January and February and with June, September, and October being the driest months. Precipitation in the higher

^{1/} "Reconnaissance Land Classification of Fish Lake Valley, Esmeralda County, Nevada," in State of Nevada, Office of the State Engineer, Water Resources Bulletin No. 11, 1950.

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altitudes of the drainage area are estimated to range with altitude from 9 to over 20 inches, with greatest precipitation in the White Mountains. Six perennial streams flow from the White Mountains into the valley. It has been estimated that the longtime average annual amount of ground water available to wells is around 30,000 acre-feet.^{1/}

ULTIMATE NUMBER OF CONSUMERS

According to the cooperative's application and letter of September 29, 1952, there are 73 signed members and 27 potential members. These 100 members account for the 225 consumer units estimated by the cooperative.

TABLE V

NUMBER OF CONSUMER UNITS AS ESTIMATED BY THE COOPERATIVE

Consumer Class	Signed	Potential	Total
Farm	61	1	62
Nonfarm Residential	17	—	17
Small Commercial	3	3	6
Large Commercial	3	2	5
Schools	2	—	2
Irrigation	69	64	133
Total	155	70	225

The cooperative's number of farm and nonfarm residential consumer units represents a somewhat larger number of dwelling units. Should all the residential members be served, the number of meters probably would be a few more than the cooperative's estimated consumer units in these classes. Included in the survey were 54 existing and planned dwelling units for 37 consumer units as classified by the cooperative. If each of the remaining 42 farm and residential consumer units not contacted in the survey has only one dwelling, there would be a total of 96 dwelling units to be served and a somewhat smaller number of meters for these classes. Three of the farm respondents did not have housing at the time, so there were 51 existing dwelling units in the survey and an indicated 90 existing units for the total number of consumers estimated by the cooperative.

^{1/} State of Nevada, Office of the State Engineer, Water Resources Bulletin No. 11, Preliminary Report on Ground Water in Fish Lake Valley, Nevada, and California, 1950.

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The 1950 U. S. Census of Housing reported a total of 513 dwelling units for the county of Esmeralda. Of this total only 269 were occupied, 31 farm and 238 nonfarm. The situation has undoubtedly changed since the 1950 Census. The appraiser reports barracks are being moved into the area from the Tonopah Air Force Base to be used as housing. Applications for land under the Desert Homestead Act have come in at a rapid rate with over 100 filed in 1949. However, with only about 10 percent of the land applied for reported as suitable for immediate development in crops, the number of applications to be turned down may be expected to be high. The 1950 land survey of the Nevada part of the valley showed approximately 4,500 acres of Class I land still available and indicated a total of from 12,000 to 15,000 acres of both Class I and II land not yet under private ownership.

The appraiser found 4 interested small commercial consumers and 1 large commercial load compared with the 6 small commercial and 5 large commercial signed and potential consumers estimated by the cooperative. The Sierra Talc and Clay Company, a well established company, accounted for the 1 large commercial and 2 of the small commercial loads the appraiser found. Two mines reported as signed large commercial by the cooperative were not in operation. Census reports for Esmeralda County show 20 retail establishments in 1948 and 2 manufacturing establishments in 1947, including the Sierra Talc and Clay Company, but not including mines.

To the appraiser it appears reasonable that the cooperative's estimated number of 92 consumers, other than irrigation wells, would be in the area within a reasonable time if electricity is made available in the near future. This number is consistent with the magnitude of present development plans in the valley, but the feasibility of those plans will determine whether this or a much smaller number can be counted as stable, long-term consumers.

The number of irrigation services is more difficult to estimate. There were 20 existing and 31 planned irrigation wells indicated by respondents in the survey. This ratio of 51 wells to 29 farm consumers as classified by the cooperative would indicate a total of 109 existing and planned wells for 62 farm consumers instead of the 133 wells estimated by the cooperative. Furthermore, it appears that in some cases wells counted in the cooperative's application as "signed irrigation" were wells planned by signed farm consumers but not existing at present. If the number for signed irrigation includes some future wells, the figure of 69 is consistent with respondents' indications.

The 1950 water resources study of the area presented data for 16 wells pumped in 1949, presumably the total number in the valley at that time. This water resources study estimated that about 5,000 acres in the valley are irrigated and the census reported 5,314 acres irrigated in Esmeralda County in 1949. Additional development by wells is estimated at 15,000 to 20,000 acre-feet of water annually based on experience for 1949 and the total available for wells is estimated at around 30,000 acre-feet per year over the long run. At present rates of pumping per well, the number of wells possible would be in the neighborhood of the 133 estimated by the cooperative. The appraiser reported three well drillers in the area with sufficient work contracted to keep them working the remainder of the year. In

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Nevada, permits must be secured before wells may be drilled, so the number of wells that do develop will probably be a fairly reliable load insofar as long-term averages of available water is a determining factor.

ANALYSIS OF FUTURE KWH CONSUMPTION

Farm and Nonfarm Residential Consumers

Present average monthly kwh usage by farm and nonfarm residential units with home electric plants is not known. Usage estimates for these classes are based primarily on respondents' indications of equipment to be added within 3 years converted to an average of 379 kwh per month by applying standard usage values. The final estimates also take into account the extent to which other information acquired in the area and from secondary sources support or modify the indicated usage.

Whereas 58 percent of the farm and nonfarm residential respondents reported home electric plants using diesel or gasoline, other sources of energy are important. Table VI shows that 75 percent of these residences are presently served with LP gas. The average consumption of electricity indicated for the future depends in part on the plans of over one-half of those presently using gas to abandon it completely in favor of electricity.

TABLE VI

STATUS OF LP GAS USE IN THE AREA

Respondents' Position With Respect to Use of LP Gas	Number in Survey	Percent of Respondents
Not Using and Not Planning to Use	11	25
Presently Using:		
Planning Complete Change to Electricity	19	42
Planning to Continue Use of Gas	15	33
Total	45	100
<u>Using LP Gas for:</u>	<u>Number Planning to Change to Electricity</u>	<u>Number Planning to Continue Using Gas</u>
Cooking	20	14
Water Heating	10	5
Refrigeration	22	2
House Heating	1	3

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According to the 1950 Census of Housing for Esmeralda County, important competitive fuels were liquid fuels for heating and wood and coal for cooking. The appraiser reports that ranchers in the area express the belief that central station electricity at relatively high rates would be less expensive and more dependable than the equipment they are now using.

Wholesale prices for fuels delivered in the valley are as follows:

Butane Gas	\$9.00 per 100 pounds
Stove Oil	19.4¢ per gallon
Diesel Oil	20.6¢ per gallon
Gasoline	30.4¢ per gallon

The appraiser reports the ranchers also are convinced that adequate electricity is necessary for development of the valley and are willing to pay more than is charged in other areas if necessary. Data in the application reveal farm and nonfarm residential consumers are willing to pay monthly minimums averaging about \$9 per consumer. One-fourth made no guarantee, 70 percent are willing to pay from \$5 to \$15, and the remaining 5 percent are willing to pay from \$20 to \$30 per month. The willingness to pay high minimums is important because of the large number of the proposed consumers who do not reside in the valley all of the year.

A comparison of area characteristics with those of the area served by a neighboring system is presented in Table VII. This neighbor is the most comparable system within a radius of 200 miles for which adequate kwh consumption data was available. The area of the neighbor system is similar to Esmeralda County with respect to the dominance of livestock other than dairy and poultry and with respect to the amount of off-farm employment. In the neighbor's area, the extent of irrigation is less and the importance of dairy sales is greater. The system being compared has been energized 13 years.

The major difference in consumption to be expected for the proposed system and that of this neighbor will be a result of the differences in the length of time consumers have had electricity. Based on census data, it appears that the proportion of farms in the proposed service area with electricity from home plants for over 5 years is about two-thirds the proportion of farms with electricity from either home plants or a central station in the neighbor's area. On this basis it would be expected that initial consumption of consumers of the proposed system would be about two-thirds the present consumption level of the neighbor system. Because usage with home plants is assumed to be less than with adequate central station service after the same length of time with electricity, the initial consumption for the proposed system's consumers may be less than two-thirds the level of the neighbor system's consumers. If initial consumption should be between one-half and two-thirds of the neighbor's, or 190 kwh per month, and if the annual rate of increase in monthly consumption should be higher, say 35 kwh in the first few years, it would require about 5½ years to achieve the 379 kwh indicated within 3 years by respondents' plans and unadjusted kwh usage values.

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TABLE VII
DATA ON NEIGHBORING SYSTEM COMPARED WITH
GENERAL AREA OF PROPOSED SYSTEM

Item	Neighbor System	Proposed System ^{a/}	Ratio of Proposed System to Neighbor
Acres Per Farm - 1950	947	936	.99
Value of Farm Land and Buildings Per Acre - 1950	\$56.91	\$111.37	1.96
Average Gross Income From Farm Products Sold - 1949	\$8,249	\$8,976	1.09
Percent Farms with Electricity - 1950 ^{b/}	100	68	.68
Estimated Percent of All Farms with Electricity over 5 Yrs. - 1950 ^{c/}	77	50	.65
Cost of Purchased Power Fiscal - 1951	0.71¢	---	---
<u>Average Monthly Farm Kwh</u>			
1947	187	---	---
1952	322	---	---
Increase per year 1947-1952	27	---	---

a/ Esmeralda County, Nevada.

b/ Includes home plants. All farms in area of neighbor system have central station service. None of those in proposed system area report central station service.

c/ Number of farms with electricity 1945 as percent of total farms 1950.

That it probably will take longer than 3 years to achieve levels indicated by raw data is supported by the results of a field appraisal of the neighbor system. Trends in consumption suggest that for the neighbor it will require from 4 to 4½ years for farm consumers and 5 years for nonfarm consumers to achieve the levels raw data indicated would be achieved within 3 years. Field appraisals have been made within the past few years for several new systems in the area of Nevada and neighboring States. For the 5 of these systems which have 3 or more years' operating history, an average of 5½ years will be required at actual rates of increase to achieve farm consumption indicated by unadjusted appraisal data.

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There are several reasons for expecting the relatively high initial average of 190 kwh per month for farm and residential consumers which was indicated by comparison with the neighbor system. The appraiser reports that of the large number of home electric plants owned by respondents, most are 110 volt systems; and, therefore, a full line of small appliances are already in use. The high minimums signed members are willing to pay would insure high minimum kwh usage. Using the rate schedule of one of the nearest operating systems adjusted for wholesale power costs prevailing in that part of the West, the various minimum payments offered by signed members would pay for an average use of between 175 and 200 kwh per month. A flat \$7.50 minimum, which over one-half the members in these classes were willing to pay might be the equivalent of 75 to 100 kwh, depending on the rate schedule adopted. The ratio of dwelling units to the probable number of meters as classified by the appraiser is 1.2 to 1.0. This connection of multiple units to one meter would result in higher average use per meter, a factor reflected in respondents' indications.

The high cost of alternative sources of energy is a factor which would encourage the use of electricity. However, the present widespread use of equipment requiring other fuels could be expected to delay the growth of electricity use to the extent that this equipment is new and its conversion would involve considerable additional investment. The large number of valley residents that leave in the early fall and return in the late spring would be a factor lowering average kwh consumption below that indicated on an annual basis. If these seasonal residents are the one-quarter of the signed members unwilling to guarantee a minimum payment and if they are away from November 1 to April 1, or away an average of 6 months, the 379 kwh average monthly use indicated should be adjusted downward to 332 kwh per month average over the year ($25\% \times .5 \text{ year} = 12.5\% \text{ decrease in average kwh}$). The actual downward adjustment for this factor probably should be something less than this, or about 350 kwh.

In view of the preceding facts and analysis, adjustments must be made in the indications of respondents in order to arrive at estimates of usage for the third year after energization. Table VIII shows indications for major uses and estimated kwh usage after adjustments. Adjustments include some reduction in appliance saturation to allow for a delay in the changeover of some equipment from other fuels and a 7.7 percent reduction in kwh use to allow for the seasonal residence of some consumers.

After adjustments the estimate is 295 kwh per month within 3 years for farm and nonfarm residential consumers. This represents an average of 335 kwh for farm consumers and 110 kwh for nonfarm residential consumers. This relation is based on the ratio which indicated use of each class bears to indicated use for both classes weighted by an estimate of meters in each class. Analysis and estimates for these classes are based on a per meter basis according to the way in which respondents and the appraiser expected loads to be connected. To apply these kwh estimates to estimates of consumer units as classified by the cooperative, farm kwh estimates should be multiplied by 1.13.

TABLE VIIIINDICATED AND ESTIMATED KWH USAGE, FARM AND NONFARM
RESIDENTIAL CONSUMERS, BY MAJOR USES

Uses	Appliance Saturation	Indicated		Estimated Annual Kwh Consumption Per 100 Consumers
		Per 100 Consumers	Annual Kwh Percent of Total	
<u>Major Household Uses</u>				
Water Heater	53	159,900	35.2	121,836
Range	58	69,360	15.3	36,551
Freezer, Cabinet	76	68,040	15.0	60,641
Refrigerator	102	41,808	9.2	32,563
House Lighting	118	35,340	7.8	32,619
Pressure System	71	15,330	3.4	14,150
<u>Productive Uses</u>	--	17,399	3.8	16,059
<u>Other Uses</u>	--	47,148	10.3	40,330
Total		454,325	100.0	354,749

Estimated kwh per consumer per year to be attained in 3 years
following energization 3,547

Estimated kwh per consumer per month to be attained in 3 years
following energization 295

Irrigation

Of the 19 farms in Esmeralda County as reported by the census for 1950, 14 or about three-fourths of the farms irrigate approximately 30 percent of the total land in farms. Irrigated pasture accounts for about two-thirds of the land irrigated. Information presented in the analysis of the expected numbers of wells indicates wells and land irrigated will increase.

Most irrigation is the open ditch type. Overhead sprinkler systems are being introduced. Power is mostly from diesel and butane fuels. The depth to water averages about 20 feet below land surface in the north end of the valley and about 75 in the south end. Indicated kw requirements are based on an average of 26 HP per installation.

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Pump irrigation is used to supplement water from streams in the case of a few large ranches which have been in operation a number of years and which have water rights to water found in streams within the area. One respondent who operates a large ranch estimated power would be used for irrigation about 90 days per year, while small ranchers indicated they would be pumping 180 days per year. In general, most kwh usage would be during a 5 months pumping season.

Estimates of electricity consumption for irrigation are based on indications that adequate water will be available. On the basis of chemical tests, the quality of the water for crops appears to be satisfactory in most parts of the valley.

For all classes, the estimates of numbers of consumers and the estimates of average kwh requirements are believed to be consistent with present development plans for Fish Lake Valley as revealed by respondents in the appraisal and other sources of information. In some respects, these plans appear to be on the margin of feasibility and should they prove unsuccessful total power use would be much lower than estimated.